



Evaluation Board for AK8125A

AKD8125A-miniEva

1. Description

AKD8125A-miniEva-Y is a common evaluation board and can produce a center or down spectrum spreading output with pin-selectable modulation ratio. AKD8125A-miniEva-Y has three footprint types for crystal unit.

2. Ordering Information

AKD8125A-miniEva-Y allows the user to choose a device type and a crystal unit.

AKD8125A-miniEva-Y

A: Device Type
A: AK8125A

Y: 3 Types of Crystal Unit

- Type-1: 49 Type Crystal Unit or External Clock
- Type-2: 5032 Type Crystal Unit or External Clock
- Type-3: 3225 Type Crystal Unit or External Clock

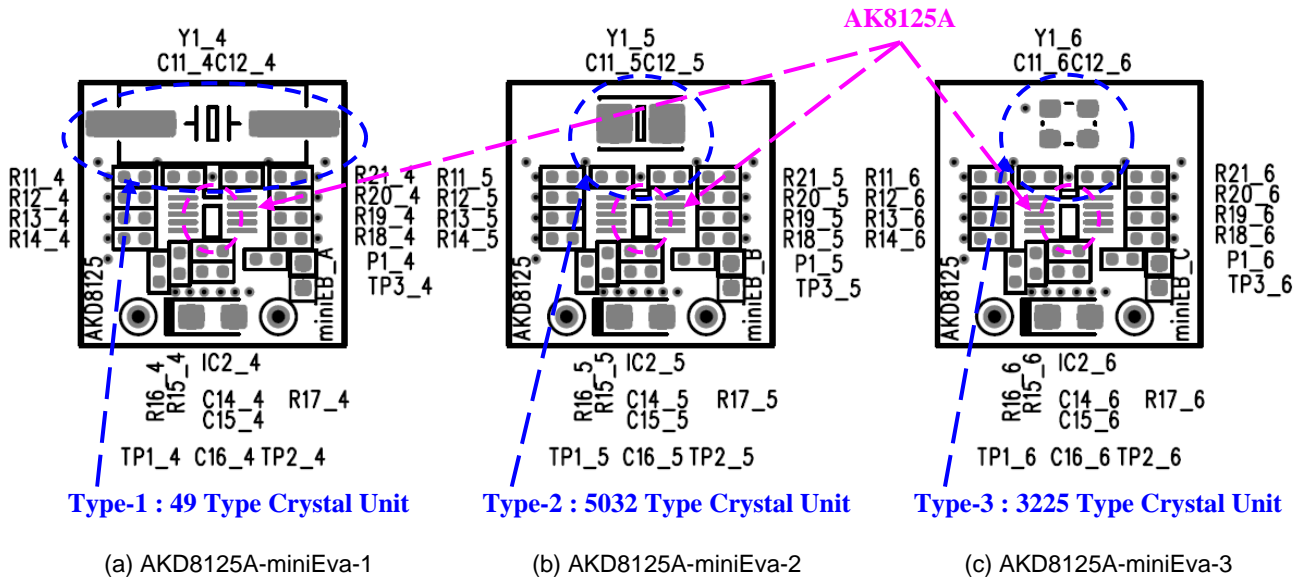
3. Configuration

The AKD8125A-miniEva-Y allows the user to set all function for AK8125A by 0[Ω] chip resistors.

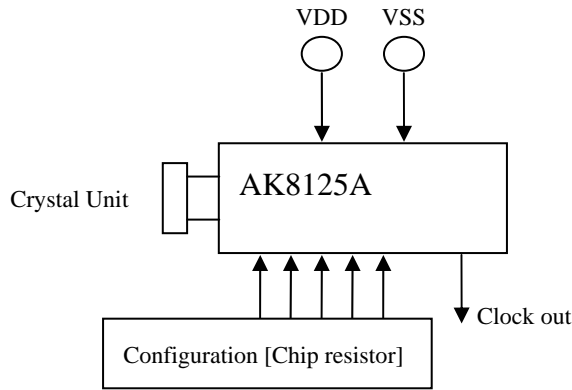
The modulation mode and the modulation ratio are selectable by the state of the SS_SEL[1:0] pins.

The operation frequency range applying to the board is required to select by the state of the F_SEL[1:0] and OUTMPX pins.

- AKD8125A_miniEva Evaluation Board type
 - 1 2 3
 - Spread Off
 - Center Spread
 - ±0.125% ±0.25% ±0.75% ±1.5%
 - Down Spread
 - 0.25% -0.5% -1.5% -3.0%
 - Input Clock Source
 - Crystal Unit External Clock
 - Input Frequency and Scaling
 - 6.1-8.32MHz(x1) 6.1-8.32MHz(x2)
 - 6.1-8.32MHz(x4) 7.80-10.40MHz(x1)
 - 7.80-10.40MHz(x2) 7.80-10.40MHz(x4)
 - 9.36-12.48MHz(x1) 9.36-12.48MHz(x2)
 - 9.36-12.48MHz(x4) 12.48-16.64MHz(x1)
 - 12.48-16.64MHz(x2) 12.48-16.64MHz(x4)
 - 15.60-20.80MHz(x1) 15.60-20.80MHz(x2)
 - 15.60-20.80MHz(x4) 18.72-24.96MHz(x1)
 - 18.72-24.96MHz(x2) 18.72-24.96MHz(x4)
 - 24.96-33.28MHz(x1) 24.96-33.28MHz(x2)
 - 31.20-41.60MHz(x1) 31.20-41.60MHz(x2)
 - 37.44-49.92MHz(x1) 37.44-49.92MHz(x2)
- Default setting



Block Diagram



AK8125A-miniEva-Y Evaluation Board

5. Absolute Maximum Rating

Over operating free-air temperature range unless otherwise noted ⁽¹⁾

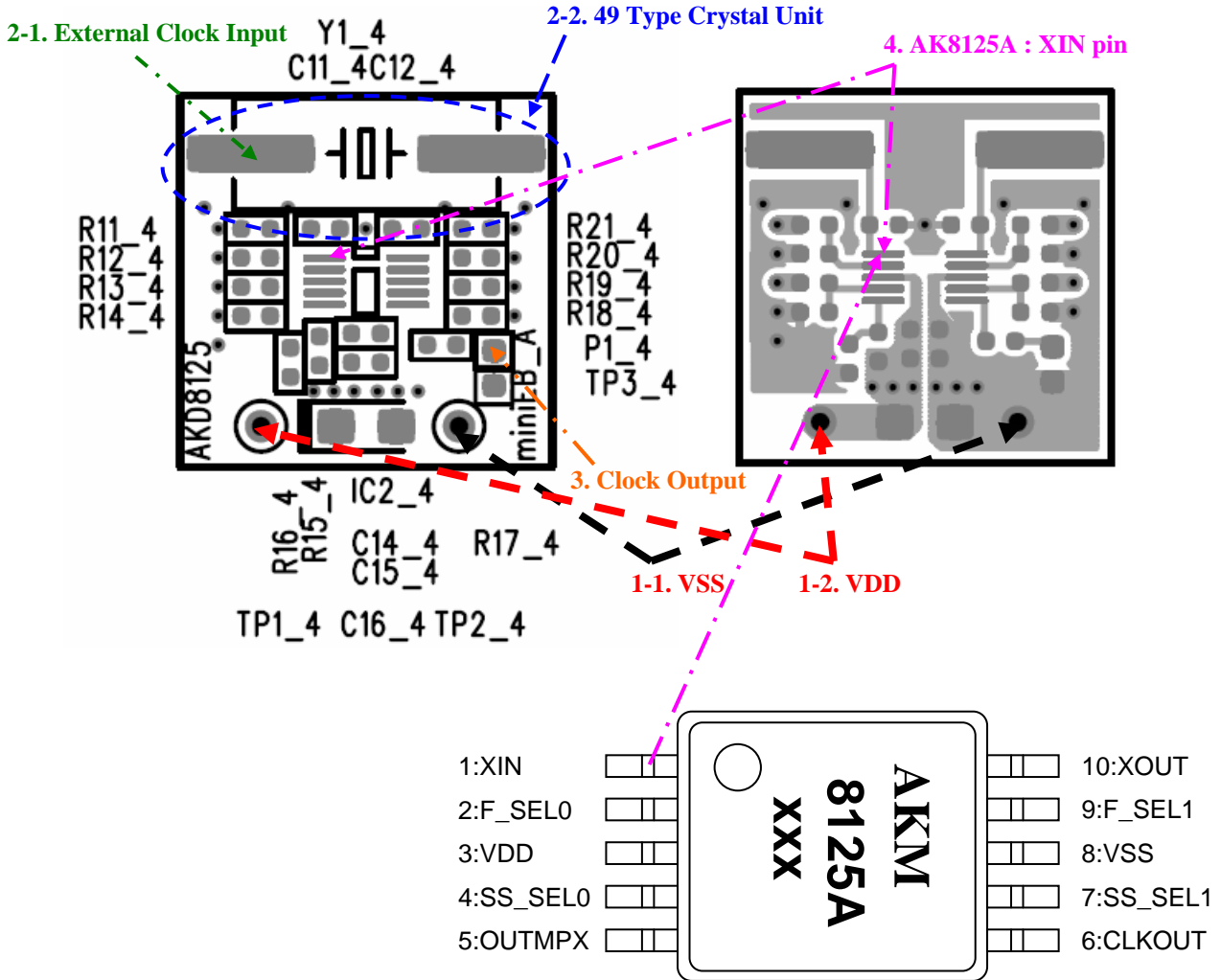
Items	Symbol	Ratings	Unit
Supply voltage	VDD/VDDI	-0.3 to 4.6	V
Input voltage	V _{in}	VSS-0.3 to VDD+0.3	V
Input current (any pins except supplies)	I _{IN}	±10	mA
Storage temperature	T _{stg}	-55 to 130	°C

Note

(1) Stress beyond those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. These are stress ratings only. Functional operation of the device at these or any other conditions beyond those indicated under “Recommended Operating Conditions” is not implied. Exposure to absolute-maximum-rating conditions for extended periods may affect device reliability. Electrical parameters are guaranteed only over the recommended operating temperature range.

6.1. Type-1: AKD8125A-miniEva-1

6.1.1 Functions



1-1. VSS, 1-2. VDD

Please connect the lead line to VDD (3.3V; Red) and VSS (GND; Black).

2-1. External Clock Input

It is possible to input the external clock for IC2_4 by connecting the lead line from Y1_4.

2-2. Crystal Unit

Y1_4: 49 type crystal oscillator are mountable.

C11_4 and C12_4 are the load capacitors for frequency adjustment.

3. Clock Output, 4. AK8125A

Clock output from AK8125A leads to pads P1_4. Spectrum Analyzer or Oscilloscope is available to measure clock performances by connecting here.

Table 6.1.1. AKD8125A-miniEva-1 top view

Name	Function	Name	Function
IC2_4	AK8125A	R16_4	Connecting OUTMPX pin to GND
Y1_4	49 Type Crystal Connection or an External Clock Input	R17_4	Connecting CLKOUT pin to P1_4
TP1_4	VDD = 3.0 ~ 3.6[V]	R18_4	Connecting SS_SEL1 pin to GND
TP2_4	GND	R19_4	Connecting SS_SEL1 pin to VDD
TP3_4	GND	R20_4	Connecting F_SEL1 pin to GND
P1_4	CLKOUT pin	R21_4	Connecting F_SEL1 pin to VDD
R11_4	Connecting F_SEL0 pin to VDD	C11_4	Load Capacitor Connection
R12_4	Connecting F_SEL0 pin to GND	C12_4	Load Capacitor Connection
R13_4	Connecting SS_SEL0 pin to VDD	C14_4	0.1[μ F]
R14_4	Connecting SS_SEL0 pin to GND	C15_4	Open
R15_4	Connecting OUTMPX pin to VDD	C16_4	22[μ F]

6.1.2. Configuration

Chip Resistor Setting

(1). Modulation Mode Selection (#4, 7 : SS_SEL0, SS_SEL1 pin)

Modulation mode is selected by setting these 0[Ω] chip resistors.

Table 6.1.2 : Modulation Mode Selection

pin		Modulation Mode	Modulation Ratio	Chip Resistor Setting			
SS_SEL1	SS_SEL0			R13_4	R14_4	R18_4	R19_4
L	L	Down Spread	-0.25[%]	Open	Short	Short	Open
L	M	Down Spread	-0.5[%]	Open	Open	Short	Open
L	H	Down Spread	-1.5[%]	Short	Open	Short	Open
M	L	Down Spread	-3.0[%]	Open	Short	Open	Open
M	M	Spread Off	-	Open	Open	Open	Open
M	H	Center Spread	±0.125[%]	Short	Open	Open	Open
H	L	Center Spread	±0.25[%]	Open	Short	Open	Short
H	M	Center Spread	±0.75[%]	Open	Open	Open	Short
H	H	Center Spread	±1.5[%]	Short	Open	Open	Short

(2). Operation Frequency Range Selection (#2, 5, 9 : F_SEL0, F_SEL1, OUTMPX pin)

Operation frequency range is selected by setting these 0[Ω] chip resistors.

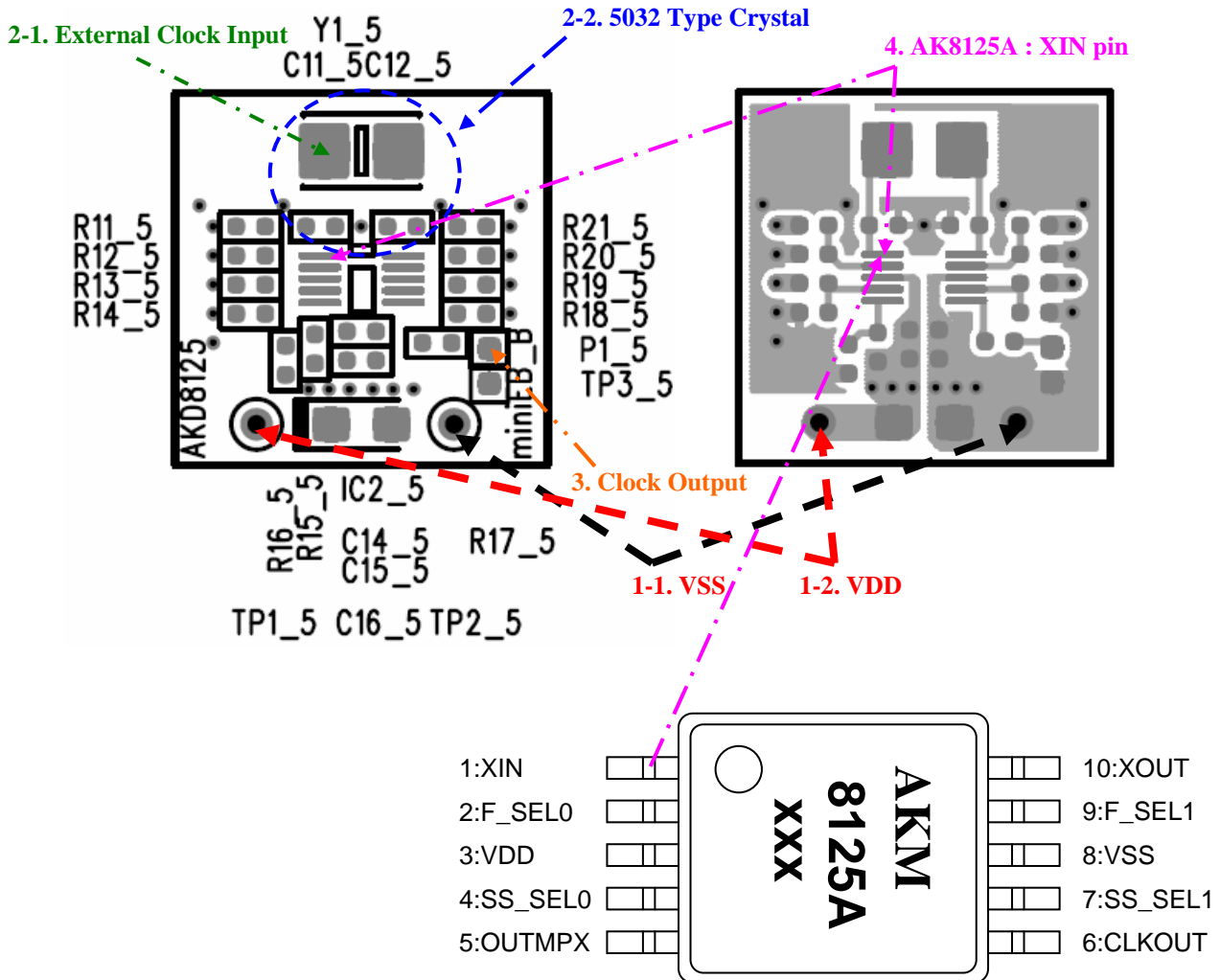
Table 6.1.3 : Modulation Ratio Selection

pin		Input Frequency Range	Output Frequency Range		
F_SEL1	F_SEL0		OUTMPX pin = "L"	OUTMPX pin = "M"	OUTMPX pin = "H"
L	L	6.1-8.32[MHz]	6.1-8.32[MHz]	12.2-16.64[MHz]	24.4-33.28[MHz]
L	M	7.80-10.40[MHz]	7.80-10.40[MHz]	15.60-20.80[MHz]	31.20-41.60[MHz]
L	H	9.36-12.48[MHz]	9.36-12.48[MHz]	18.72-24.96[MHz]	37.44-49.92[MHz]
M	L	12.48-16.64[MHz]	12.48-16.64[MHz]	24.96-33.28[MHz]	49.92-66.56[MHz]
M	M	15.60-20.80[MHz]	15.60-20.80[MHz]	31.20-41.60[MHz]	62.40-83.20[MHz]
M	H	18.72-24.96[MHz]	18.72-24.96[MHz]	37.44-49.92[MHz]	74.88-99.84[MHz]
H	L	24.96-33.28[MHz]	24.96-33.28[MHz]	49.92-66.56[MHz]	-
H	M	31.20-41.60[MHz]	31.20-41.60[MHz]	62.40-83.20[MHz]	-
H	H	37.44-49.92[MHz]	37.44-49.92[MHz]	74.88-99.84[MHz]	-

pin			Chip Resistor Setting					
OUTMPX	F_SEL1	F_SEL0	R11_4	R12_4	R15_4	R16_4	R20_4	R21_4
L	L	L	Open	Short	Open	Short	Short	Open
L	L	M	Open	Open	Open	Short	Short	Open
L	L	H	Short	Open	Open	Short	Short	Open
L	M	L	Open	Short	Open	Short	Open	Open
L	M	M	Open	Open	Open	Short	Open	Open
L	M	H	Short	Open	Open	Short	Open	Open
L	H	L	Open	Short	Open	Short	Open	Short
L	H	M	Open	Open	Open	Short	Open	Short
L	H	H	Short	Open	Open	Short	Open	Short
M	L	L	Open	Short	Open	Open	Short	Open
M	L	M	Open	Open	Open	Open	Short	Open
M	L	H	Short	Open	Open	Open	Short	Open
M	M	L	Open	Short	Open	Open	Open	Open
M	M	M	Open	Open	Open	Open	Open	Open
M	M	H	Short	Open	Open	Open	Open	Open
M	H	L	Open	Short	Open	Open	Open	Short
M	H	M	Open	Open	Open	Open	Open	Short
M	H	H	Short	Open	Open	Open	Open	Short
H	L	L	Open	Short	Short	Open	Short	Open
H	L	M	Open	Open	Short	Open	Short	Open
H	L	H	Short	Open	Short	Open	Short	Open
H	M	L	Open	Short	Short	Open	Open	Open
H	M	M	Open	Open	Short	Open	Open	Open
H	M	H	Short	Open	Short	Open	Open	Open

6.2. Type-2: AKD8125A-miniEva-2

6.2.1 Functions



1-1. VSS, 1-2. VDD

Please connect the lead line to VDD (3.3V; Red) and VSS (GND; Black).

2-1. External Clock Input

It is possible to input the external clock for IC2_5 by connecting the lead line from Y1_5.

2-2. Crystal Unit

Y1_5: 5032 type crystal oscillator are mountable.

C11_5 and C12_5 are the load capacitors for frequency adjustment.

3. Clock Output, 4. AK8125A

Clock output from AK8125A leads to pads P1_5. Spectrum Analyzer or Oscilloscope is available to measure clock performances by connecting here.

Table 6.2.1. AKD8125A-miniEva-2 top view

Name	Function	Name	Function
IC2_5	AK8125A	R16_5	Connecting OUTMPX pin to GND
Y1_5	5032 Type Crystal Connection or an External Clock Input	R17_5	Connecting CLKOUT pin to P1_5
TP1_5	VDD = 3.0 ~ 3.6[V]	R18_5	Connecting SS_SEL1 pin to GND
TP2_5	GND	R19_5	Connecting SS_SEL1 pin to VDD
TP3_5	GND	R20_5	Connecting F_SEL1 pin to GND
P1_5	CLKOUT pin	R21_5	Connecting F_SEL1 pin to VDD
R11_5	Connecting F_SEL0 pin to VDD	C11_5	Load Capacitor Connection
R12_5	Connecting F_SEL0 pin to GND	C12_5	Load Capacitor Connection
R13_5	Connecting SS_SEL0 pin to VDD	C14_5	0.1[μ F]
R14_5	Connecting SS_SEL0 pin to GND	C15_5	Open
R15_5	Connecting OUTMPX pin to VDD	C16_5	22[μ F]

6.2.2. Configuration

Chip Resistor Setting

(1). Modulation Mode Selection (#4, 7 : SS_SEL0, SS_SEL1 pin)

Modulation mode is selected by setting these 0[Ω] chip resistors.

Table 6.2.2 : Modulation Mode Selection

pin		Modulation Mode	Modulation Ratio	Chip Resistor Setting			
SS_SEL1	SS_SEL0			R13_5	R14_5	R18_5	R19_5
L	L	Down Spread	-0.25[%]	Open	Short	Short	Open
L	M	Down Spread	-0.5[%]	Open	Open	Short	Open
L	H	Down Spread	-1.5[%]	Short	Open	Short	Open
M	L	Down Spread	-3.0[%]	Open	Short	Open	Open
M	M	Spread Off	-	Open	Open	Open	Open
M	H	Center Spread	±0.125[%]	Short	Open	Open	Open
H	L	Center Spread	±0.25[%]	Open	Short	Open	Short
H	M	Center Spread	±0.75[%]	Open	Open	Open	Short
H	H	Center Spread	±1.5[%]	Short	Open	Open	Short

(2). Operation Frequency Range Selection (#2, 5, 9 : F_SEL0, F_SEL1, OUTMPX pin)

Operation frequency range is selected by setting these 0[Ω] chip resistors.

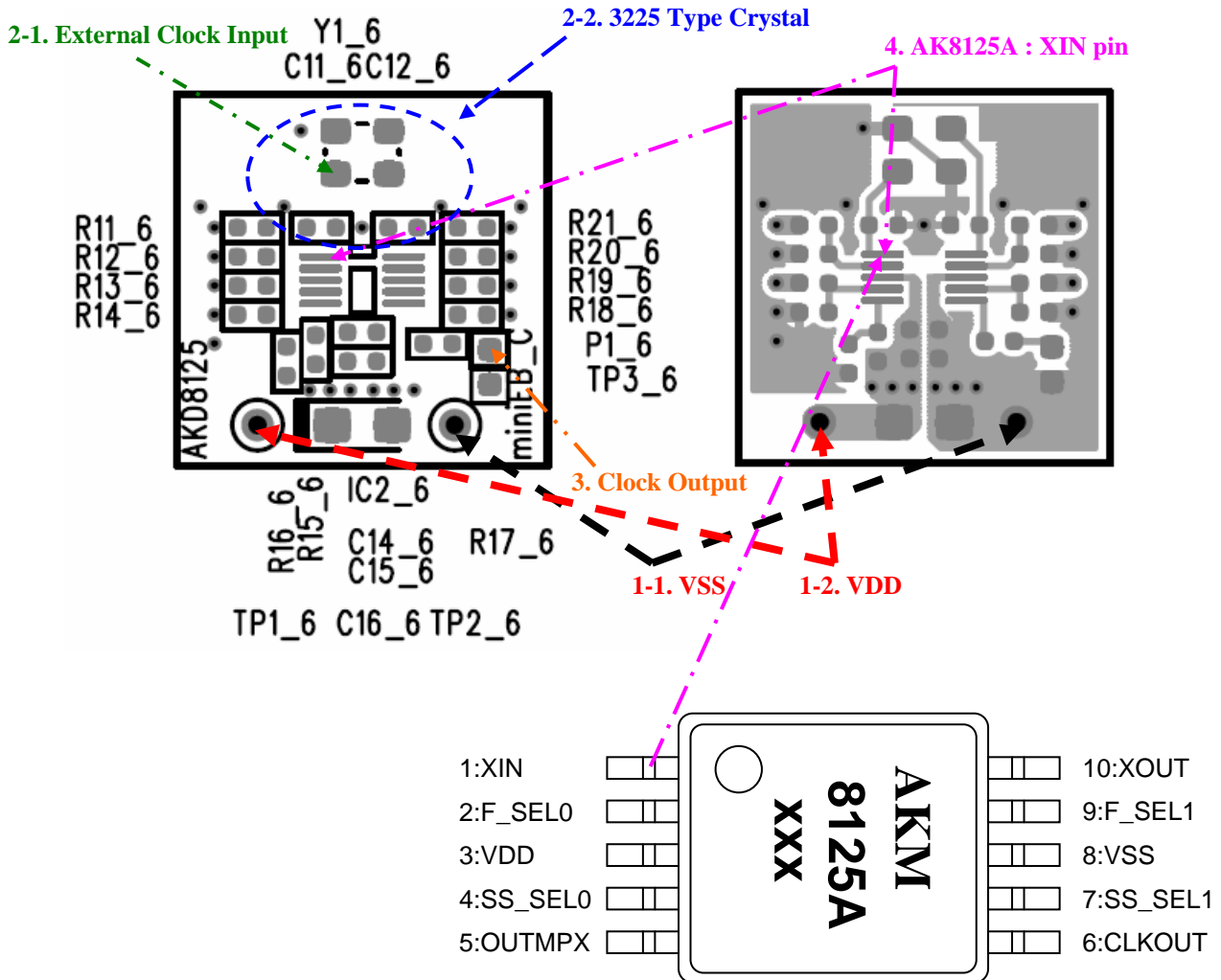
Table 6.2.3 : Modulation Ratio Selection

pin		Input Frequency Range	Output Frequency Range		
F_SEL1	F_SEL0		OUTMPX pin = "L"	OUTMPX pin = "M"	OUTMPX pin = "H"
L	L	6.1-8.32[MHz]	6.1-8.32[MHz]	12.2-16.64[MHz]	24.4-33.28[MHz]
L	M	7.80-10.40[MHz]	7.80-10.40[MHz]	15.60-20.80[MHz]	31.20-41.60[MHz]
L	H	9.36-12.48[MHz]	9.36-12.48[MHz]	18.72-24.96[MHz]	37.44-49.92[MHz]
M	L	12.48-16.64[MHz]	12.48-16.64[MHz]	24.96-33.28[MHz]	49.92-66.56[MHz]
M	M	15.60-20.80[MHz]	15.60-20.80[MHz]	31.20-41.60[MHz]	62.40-83.20[MHz]
M	H	18.72-24.96[MHz]	18.72-24.96[MHz]	37.44-49.92[MHz]	74.88-99.84[MHz]
H	L	24.96-33.28[MHz]	24.96-33.28[MHz]	49.92-66.56[MHz]	-
H	M	31.20-41.60[MHz]	31.20-41.60[MHz]	62.40-83.20[MHz]	-
H	H	37.44-49.92[MHz]	37.44-49.92[MHz]	74.88-99.84[MHz]	-

pin			Chip Resistor Setting					
OUTMPX	F_SEL1	F_SEL0	R11_5	R12_5	R15_5	R16_5	R20_5	R21_5
L	L	L	Open	Short	Open	Short	Short	Open
L	L	M	Open	Open	Open	Short	Short	Open
L	L	H	Short	Open	Open	Short	Short	Open
L	M	L	Open	Short	Open	Short	Open	Open
L	M	M	Open	Open	Open	Short	Open	Open
L	M	H	Short	Open	Open	Short	Open	Open
L	H	L	Open	Short	Open	Short	Open	Short
L	H	M	Open	Open	Open	Short	Open	Short
L	H	H	Short	Open	Open	Short	Open	Short
M	L	L	Open	Short	Open	Open	Short	Open
M	L	M	Open	Open	Open	Open	Short	Open
M	L	H	Short	Open	Open	Open	Short	Open
M	M	L	Open	Short	Open	Open	Open	Open
M	M	M	Open	Open	Open	Open	Open	Open
M	M	H	Short	Open	Open	Open	Open	Open
M	H	L	Open	Short	Open	Open	Open	Short
M	H	M	Open	Open	Open	Open	Open	Short
M	H	H	Short	Open	Open	Open	Open	Short
H	L	L	Open	Short	Short	Open	Short	Open
H	L	M	Open	Open	Short	Open	Short	Open
H	L	H	Short	Open	Short	Open	Short	Open
H	M	L	Open	Short	Short	Open	Open	Open
H	M	M	Open	Open	Short	Open	Open	Open
H	M	H	Short	Open	Short	Open	Open	Open

6.3. Type-3: AKD8125A-miniEva-3

6.3.1 Functions



1-1. VSS, 1-2. VDD

Please connect the lead line to VDD (3.3V; Red) and VSS (GND; Black).

2-1. External Clock Input

It is possible to input the external clock for IC2_6 by connecting the lead line from Y1_6.

2-2. Crystal Unit

Y1_6: 3225 type crystal oscillator are mountable.

C11_6 and C12_6 are the load capacitors for frequency adjustment.

3. Clock Output, 4. AK8125A

Clock output from AK8125A leads to pads P1_6. Spectrum Analyzer or Oscilloscope is available to measure clock performances by connecting here.

Table 6.3.1. AKD8125A-miniEva-3 top view

Name	Function	Name	Function
IC2_6	AK8125A	R16_6	Connecting OUTMPX pin to GND
Y1_6	3225 Type Crystal Connection or an External Clock Input	R17_6	Connecting CLKOUT pin to P1_6
TP1_6	VDD = 3.0 ~ 3.6[V]	R18_6	Connecting SS_SEL1 pin to GND
TP2_6	GND	R19_6	Connecting SS_SEL1 pin to VDD
TP3_6	GND	R20_6	Connecting F_SEL1 pin to GND
P1_6	CLKOUT pin	R21_6	Connecting F_SEL1 pin to VDD
R11_6	Connecting F_SEL0 pin to VDD	C11_6	Load Capacitor Connection
R12_6	Connecting F_SEL0 pin to GND	C12_6	Load Capacitor Connection
R13_6	Connecting SS_SEL0 pin to VDD	C14_6	0.1[μ F]
R14_6	Connecting SS_SEL0 pin to GND	C15_6	Open
R15_6	Connecting OUTMPX pin to VDD	C16_6	22[μ F]

6.3.2. Configuration

Chip Resistor Setting

(1). Modulation Mode Selection (#4, 7 : SS_SEL0, SS_SEL1 pin)

Modulation mode is selected by setting these 0[Ω] chip resistors.

Table 6.3.2 : Modulation Mode Selection

pin		Modulation Mode	Modulation Ratio	Chip Resistor Setting			
SS_SEL1	SS_SEL0			R13_6	R14_6	R18_6	R19_6
L	L	Down Spread	-0.25[%]	Open	Short	Short	Open
L	M	Down Spread	-0.5[%]	Open	Open	Short	Open
L	H	Down Spread	-1.5[%]	Short	Open	Short	Open
M	L	Down Spread	-3.0[%]	Open	Short	Open	Open
M	M	Spread Off	-	Open	Open	Open	Open
M	H	Center Spread	±0.125[%]	Short	Open	Open	Open
H	L	Center Spread	±0.25[%]	Open	Short	Open	Short
H	M	Center Spread	±0.75[%]	Open	Open	Open	Short
H	H	Center Spread	±1.5[%]	Short	Open	Open	Short

(2). Operation Frequency Range Selection (#2, 5, 9 : F_SEL0, F_SEL1, OUTMPX pin)

Operation frequency range is selected by setting these 0[Ω] chip resistors.

Table 6.3.3 : Modulation Ratio Selection

pin		Input Frequency Range	Output Frequency Range		
F_SEL1	F_SEL0		OUTMPX pin = "L"	OUTMPX pin = "M"	OUTMPX pin = "H"
L	L	6.1-8.32[MHz]	6.1-8.32[MHz]	12.2-16.64[MHz]	24.4-33.28[MHz]
L	M	7.80-10.40[MHz]	7.80-10.40[MHz]	15.60-20.80[MHz]	31.20-41.60[MHz]
L	H	9.36-12.48[MHz]	9.36-12.48[MHz]	18.72-24.96[MHz]	37.44-49.92[MHz]
M	L	12.48-16.64[MHz]	12.48-16.64[MHz]	24.96-33.28[MHz]	49.92-66.56[MHz]
M	M	15.60-20.80[MHz]	15.60-20.80[MHz]	31.20-41.60[MHz]	62.40-83.20[MHz]
M	H	18.72-24.96[MHz]	18.72-24.96[MHz]	37.44-49.92[MHz]	74.88-99.84[MHz]
H	L	24.96-33.28[MHz]	24.96-33.28[MHz]	49.92-66.56[MHz]	-
H	M	31.20-41.60[MHz]	31.20-41.60[MHz]	62.40-83.20[MHz]	-
H	H	37.44-49.92[MHz]	37.44-49.92[MHz]	74.88-99.84[MHz]	-

pin			Chip Resistor Setting					
OUTMPX	F_SEL1	F_SEL0	R11_6	R12_6	R15_6	R16_6	R20_6	R21_6
L	L	L	Open	Short	Open	Short	Short	Open
L	L	M	Open	Open	Open	Short	Short	Open
L	L	H	Short	Open	Open	Short	Short	Open
L	M	L	Open	Short	Open	Short	Open	Open
L	M	M	Open	Open	Open	Short	Open	Open
L	M	H	Short	Open	Open	Short	Open	Open
L	H	L	Open	Short	Open	Short	Open	Short
L	H	M	Open	Open	Open	Short	Open	Short
L	H	H	Short	Open	Open	Short	Open	Short
M	L	L	Open	Short	Open	Open	Short	Open
M	L	M	Open	Open	Open	Open	Short	Open
M	L	H	Short	Open	Open	Open	Short	Open
M	M	L	Open	Short	Open	Open	Open	Open
M	M	M	Open	Open	Open	Open	Open	Open
M	M	H	Short	Open	Open	Open	Open	Open
M	H	L	Open	Short	Open	Open	Open	Short
M	H	M	Open	Open	Open	Open	Open	Short
M	H	H	Short	Open	Open	Open	Open	Short
H	L	L	Open	Short	Short	Open	Short	Open
H	L	M	Open	Open	Short	Open	Short	Open
H	L	H	Short	Open	Short	Open	Short	Open
H	M	L	Open	Short	Short	Open	Open	Open
H	M	M	Open	Open	Short	Open	Open	Open
H	M	H	Short	Open	Short	Open	Open	Open

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